Mastering Business Requirements

13 rules for the right tracks

Introduction

Every enterprise IT project starts with business requirements. However, they are often inadequately analysed, phrased unclearly or considered in isolation. As long as the objective is to create a quick outline solution, these shortcomings don't carry any weight, and can even promote creativity. But if solutions are to be realised with an optimum business value, requirements are the central mediator between the explored problem area and the implemented solution.

For DB Systel, as an internal digital partner of Deutsche Bahn, this is particularly relevant because we seek solutions with a sustainable benefit throughout the entire life cycle.

Starting from the question of how to improve handling of business requirements, we compiled problem hypotheses based on interviews, specialist literature and our own consulting experience, and had them evaluated by IT managers from the whole Deutsche Bahn AG in terms of their relevance. Ultimately, there were 13 challenges which emerged. For these, we worked out the causes, investigated the potential loss, identified possible counter measures and distilled it all to one golden rule per challenge.

During the process, it quickly became apparent that these challenges are relevant regardless of whether classic or agile approaches are adopted. And it became clear how important it is to establish a constructive interplay between the business perspective and the user and technology perspective and observe them as a whole.

One of our golden rules is: „Question existing work methods and solutions and rethink them at the beginning of projects — it will never be so cost-effective to do so again." With the publication of this work, we would kindly invite any interested parties to question their own requirement processes and perhaps find impulses for improvement.

**Dirk Röder & David Gilbert
(DB Systel)**

DB Systel
Moving the digital future. Together.

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Foreword

Working professionally with requirements is and remains a core competence in the software world. The reason is simple: the human brain isn't powerful enough to remember and process the elicited requirements of even the simplest systems. So requirements documentation is like an extended, shared memory of a software project. Particularly in the era of digitalisation, software is becoming more complex. And that's why we still need a professional, structured approach to dealing with requirements. The chosen procedural model will then determine how we specifically develop, test, document and manage the requirements. There is an extensive range of options here, from agile through to waterfall.

Irrespective of the procedural model, a series of universal recipes for success exists. And I'm delighted that DB Systel is making this guideline with its own recipes for success available to the public. This guideline provides a wonderful mix of ideas and food for thought, which will certainly be useful for your work.

Many thanks to Dirk Röder and David Gilbert for this publication.

I hope you enjoy reading it and gain lots of interesting insights.

Kim Lauenroth, Chairman of IREB e.V.

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1. Overview of the Golden Rules

01 Evaluate every requirement for all stakeholders in terms of costs and benefits, prioritize the requirements across the project, and clarify any resulting conflicts at an early stage.

02 Prepare yourself to have to deal with a high level of complexity, even if this is not visible at the start.

03 In the project, create a common language as the prerequisite for ensuring that everyone is working towards the same objective.

04 Differentiate between analyzing problems and finding solutions, perform both multiple times in succession, and evaluate the findings.

05 Make the availability of project team members from the business areas a project issue.

06 Evaluate and compare the direct and indirect benefits of requirements completely from the three perspectives of the business, the user, and the targeted solution.

07 Investigate and evaluate how requirements affect corporate risks and take this into account completely and equitably in the cost/benefit analysis.

08 Question existing work methods and solutions and rethink them at the beginning of projects — it will never be so cost-effective to do so again.

09 Where necessary, document requirements in different forms appropriate to the different target groups and purposes.

10 Combine multiple methods for eliciting requirements to ensure that the requirements are recorded completely.

11 Document the results of requirements elicitation such that they can be reused and do actually reuse them.

12 Carefully check results from previous requirements elicitation processes that are to be reused to ensure that they are still valid and plan for the possibility of having to change or replace them.

13 Always look at all requirements in the context of the business necessity, through operational implementation, up to the IT solution.

change

2. Higher-Level Aspects

2.1 The requirements process is subject to the conflict between general project conditions

(Time, Scope & Budget)

Requirements are often elicited only within a limited time period and with a limited budget as part of projects. However, requirements arise continuously—completely independently of the existence of projects—in business operations or from the process of controlling a business.

This means that requirements are often recorded incompletely or imprecisely because:

- Outside the scope of a project, requirements are often neither recorded nor developed systematically.

- Within a project, the staff required from the business areas are busy with their line tasks and it is very difficult to manage them within the scope of the project plans.

This problem can be remedied with a continuous, professional requirements engineering and management process that is ideally synchronized with the processes for controlling the project portfolio.

2.2 The human factor is not taken into account sufficiently in the requirements process

Humans are involved on both the client and service provider side and, as is the case with humans, their capabilities vary. Humans differ, for example, in their perception, experience, talents, education, personal situation, and mood.

The common methods for developing requirements do not try hard enough to compensate for these differences or even exploit them. This means that the quality of requirements and the performance when eliciting them are extremely random because these aspects depend on factors such as personality, how the persons involved are feeling on that day, capabilities, etc. —and these factors are either not recorded and controlled at all, or only to a very limited extent.

This problem can be remedied by systematically considering the capabilities and talents required for the different tasks and methods. This is the direction that is currently being taken—people from different disciplines, such as requirements engineering, UX, design thinking, or lean approaches are increasingly working together.

3.   *Challenges*

3.1 Unresolved conflicts in objectives between the stakeholders lead to a lack of acceptance of the solution

Golden rule 01

Evaluate every requirement for all stakeholders in terms of costs and benefits, prioritize the requirements across the project, and clarify any resulting conflicts at an early stage.

Cause

Different stakeholders (e.g., business managers, the CIO, end users, the works council) have different perspectives on the problem and the potential solutions to the problem and pursue different objectives. Typically, business managers, for example, want to react as cost-effectively as possible and as flexibly as possible to changed environmental or business requirements. In contrast, the CIO wants standardized solutions and the ability to plan over the long term. And employees want tasks that they are as familiar with as possible and solutions that are as comfortable as possible. A further example of potential differences is that business managers want key figures that are as accurate as possible to enable them to control their company. Works councils, on the other hand, want to avoid performance checks and want to protect employees' privacy.

In principle, every requirement can affect the concerns of all stakeholders. However, the people involved in the project often look only at the consequences for the party submitting the requirement, and they neglect the other, less obvious stakeholders. This leads not only to decisions being taken incorrectly due to incomplete information, it is also often the case that the expectations of the stakeholders are not discussed in good time and the stakeholders are then surprisingly disappointed at the end of the project.

Damage

The result of this problem is that unexpected conflicts can continually arise during the term of the project, leading to increased levels of communication and lower satisfaction and trust. If unfulfilled expectations are detected only at the end of a project, the result is expensive improvements, longer projects, and lasting damage to the image of all involved.

Countermeasures

- Work out the objectives of all stakeholders and recognize and address potential conflicts at an early stage

- Document objectives and store them so that they are accessible to all parties at any time; where applicable, print them out and hang them up somewhere

- Clarify all requirements with all stakeholders at the correct respective level of abstraction iteratively, from approximate requirements down to the fine detail

- Investigate the effects of requirements from all perspectives and take these effects into account in the cost/benefit analysis

- Make sure that specific conflicts detected between objectives are addressed explicitly and clarified

3.2 Underestimating the complexity of the project leads to unrealistic expectations

Cause

The aim of all business projects is to integrate the completion of new tasks in operations or to complete existing tasks to a new quality. Assuming the persons involved in the project have a healthy level of enthusiasm for the project objectives, they quickly develop an approximate vision of how the change can be realized. It is natural that these first ideas have a certain inherent naivety: those involved in the project can only estimate the complexity of the project realistically as their understanding of the problem grows over time.

However, projects are often planned, budgets approved, results announced, etc. before this deeper understanding has had a chance to develop. Furthermore, at higher decision levels, the initial, abstract vision is often the one that remains, whereas at operational levels, the gains in insight continue to increase. The expectations of the time and budget required, and the quality of the results achieved, therefore diverge as a result.

Another aspect that can amplify this effect is that when applied strictly, user experience engineering can hide the complexity of the processes from the user, but of course does not avoid the complexity. Hence, advance presentations of the user interfaces—as UI prototypes for example—are misleading and trivialize the problem.

These phenomena are becoming increasingly important due to the rising complexity in processes and the growing awareness for the UX of the various user groups, which leads to those involved in the project trying so hard to simplify things that they no longer address the actual core of the problem.

Damage

Incorrect planning as a result of underestimating complexity is difficult to correct because it means that the current project effectively has to replace itself with another project. Therefore, incorrect planning leads almost directly to the project failing, and does so in two ways: from an economic perspective, the result of incorrect planning is that the planning cannot be realized, and time and budget generally spiral out of control. From a content perspective, incorrect planning means that the tools, methods, and skills required in the project are not available to overcome the complexity involved. As improvements would amount to the project being replanned and are therefore generally avoided, the result is often significant quality defects and thus also project failure from this perspective.

Countermeasures

- Plan projects in multiple iterations and at the beginning, work determinedly towards understanding the problem

- To overcome complexity, plan continuous modeling at multiple levels of abstraction and from multiple perspectives

- Manage the expectations of decision makers actively, accept and communicate initial uncertainties, and substantiate the planning step by step

- Only release announcements to external parties—customers, for example—when there is sufficient certainty about the complexity of the problem

- Adapt procedures and methods flexibly as soon as the certainty about the complexity increases—regardless of whether the complexity was underestimated or overestimated

Golden rule 02

Prepare yourself to have to deal with a high level of complexity, even if this is not visible at the start.

3.3 Communication problems between project team members increase the costs and risks involved in projects

Golden rule 03

In the project, create a common language as the prerequisite for ensuring that everyone is working towards the same objective.

Cause

Project team members do not speak the same language:

- Project team members often use terms only intuitively, rather than understanding and accepting one, single, unique definition.

- Furthermore, project team members at different levels of responsibility think and speak at different levels of granularity and to different degrees of abstraction, thus varying the intensity of the terms between the levels.

- This effect is amplified by the language used by individuals, which is shaped by the personality structure, environment, education, experience, and business area of the respective project team member.

- The project team members are not usually aware of any of these phenomena or they underestimate the potential risk for the project.

Damage

The consequences of communication problems can include increased levels of communication, misunderstandings being detected late, and thus late and expensive countermeasures or even failure. If means of communication (documents, models, presentations, prototypes) used in the project are not adapted to the degree of abstraction of the respective target group, this leads to dissatisfaction and mistrust. If multiple companies are involved, it is not only the image of the service provider that can be damaged.

Countermeasures

- Create an awareness for the problem and its effects in all project team members

- As far as possible, perform the problem analysis together with representatives from all interested parties involved

- Define and model terms, structures, needs, and processes together with all project team members (e.g., glossary, UML, presentations, descriptions of the contexts of use, etc.)

- Take the respective capability for abstraction of the various project team members into account using prototypes with an appropriate level of detail in each case

- Create communication documents at different levels of abstraction and detail for the respective target groups

- Schedule sufficient time, budget, and skills for these measures

3.4 A lack of a thorough problem analysis leads to suboptimal solutions

Cause

Project team members often assume a certain solution from the very beginning, with each individual often assuming a different solution. They often bring these ideas with them from their ongoing activities where, however, they are primarily occupied with things other than structured problem analysis or creative ways of finding solutions. Accordingly, these solutions are then also generally superficial and not really sustainable. Once the project team members have these ideas in their heads, however, it is difficult to get away from them.

Furthermore, there is often insufficient understanding of the actual problem that needs to be resolved. Even if project team members do perform a problem analysis, they do not direct deeper findings from the subsequent identification of solutions back into the problem description, which, if it were done, in the next iteration would generally lead to a more suitable solution. Project team members generally underestimate the benefits of this repeated switch between the problem space and solution space and therefore do not perform this activity.

It is also helpful to summarize the results of the problem analysis in a short, succinct problem statement and to keep this document as a conscious mission statement across the entire project. This helps to guide all the design decisions in the same direction.

Due to a lack of awareness, only a few projects take advantage of this opportunity.

Damage

Solution approaches that are taken too early do not cover the problem sufficiently but do heavily restrict the view of the ideal solution. This means that the potential for quality and benefits in the solution found is not fully exhausted. Similar effects to those described in Sections 3.8 and 3.12 arise.

Countermeasures

- Establish a culture in which the first and fastest idea found is not held to be the best and where rejected ideas are also seen as a valuable contribution

- Create an awareness for the difference between problem analysis and identification of solutions and the value of both; design thinking workshops at the start of the project can help in this regard

- Schedule sufficient time, capacity, and skills for the problem analysis and the iterations between analysis and design and perform both of these activities (problem analysis and iterations between analysis and design)

Golden rule 04

Differentiate between analyzing problems and finding solutions, perform both multiple times in succession, and evaluate the findings.

3.5 Insufficient consideration of operational circumstances in project planning prevents requirements being elicited accurately

Cause

The cooperation of the business areas is essential when eliciting requirements. At the beginning, it is mainly the upper management who need to be involved. As the project progresses, the next management levels come in, right down to the operational employees.

Despite this central importance for the success of the project, project managers only rarely see themselves as being responsible for managing these resources. Indeed, they often assume that the business area itself has the greatest interest in the success of the project and will therefore itself ensure the availability of the employees required.

However, it is often the upper management levels that are interested in the project. In contrast, the assignment of employees to projects takes place further down in the hierarchy, at a level where the main objective is to complete the daily tasks. Projects tend to be seen as a disruption, especially because the objective and content of these projects are only rarely already known at those lower hierarchical levels.Even if the project management accepts its responsibility for the project team members from the business areas, they often have no influence on the operational organization because the project was created too isolated from the very beginning (see also 3.13).

The only remaining option is then to see the availability of project team members from the business area as extremely risky and to counteract the effects of this risk by scheduling a sufficient buffer. However, this only helps if the project management also takes this measure seriously and, for example, schedules and—in cases of emergency—allows idle time for other project team members.

Damage

All in all, these manifold and strongly interwoven sources of error mean that (insufficient) time and availability limit the development of the requirements and an acceptable level of quality is not reached. This causes gaps, lack of clarity, and contradictions in the requirements, which are carried through to the end of the software development phase and either cannot be corrected at all or can only be corrected at a high cost.

Countermeasures

- Consider project team members from the business areas adequately in the project planning

- Record and treat measures to ensure that project team members from the business areas are allowed sufficient freedom from their normal work as a project task

- For all project activities, consider all differences with regard to mandatory attendance, flexibility, location where the work is required, risks of absence, etc. in the task profiles

- Schedule a sufficient risk buffer for uncertainty regarding project team members from business areas being released from their normal tasks and take this risk seriously

Golden rule 05

Make the availability of project team members from the business areas a project issue.

3.6 Incomplete evaluations of the user and business value lead to suboptimal solutions

Cause

The value of the requirements elicited for the user and/or the value for the business are often unclear or patchy.

- The potential benefits of requirements are not considered in the evaluation of the requirements because no measures of value are defined for requirements that have an indirect effect: while speeding up processes and reducing error rates or risks can easily be converted into money, for indirect changes or changes that take effect over the long term, this is often possible only with assumptions and arbitrary norms. By their very nature, these assumptions and arbitrary norms are associated with uncertainty, which often deters decision makers in the project from making these assumptions and accepting these norms explicitly. Such indirect benefits give rise, for example, to image improvements, increases in employee satisfaction, improvements in the usability of IT applications, or to support for (other) measures from corporate strategy.

- Cost/benefit analyses often ignore the fact that it is not requirements that create costs

and benefits, but rather the solutions that fulfill the requirements: almost every solution that can fulfill a specific requirement also has other effects and therefore the potential to bring about even greater benefits. It is rare for project team members to recognize this potential benefit and to consider it in the evaluation and implementation of a solution.

Both phenomena can lead to requirements not being prioritized on the basis of the actual value created. The traceability that is then often lacking also leads to decision makers having a lack of trust, causing requirements to be reprioritized arbitrarily based on gut feeling, which generally intensifies this error.

Damage

Imprecise or incomplete cost/benefit analyses almost always lead to incorrect decisions and therefore suboptimal solutions:

- The cheaper solution is prioritized over the more efficient solution because the benefits have not been recorded adequately.

- Business requirements are implemented in preference over user requirements, even though this leads to solutions that are difficult to use, thus diminishing the business benefits.

- User requirements are implemented in preference over business requirements even though they bring little or no business benefit.

Countermeasures

- Evaluate all requirements — including indirectly beneficial requirements — with regard to their benefit and include them in the cost/benefit analysis

- Define evaluation criteria for benefits that cannot be evaluated directly in monetary terms and agree these criteria with all decision makers; to ensure that projects can be compared over the long term and to achieve a minimum level of effort required for agreement, these criteria should be defined and agreed on a cross-project basis

- Do not view the evaluation of benefits based on requirements as final; instead, include the additional benefits of the solutions that come into question as soon as possible; use this as a basis for checking the prioritization of requirements and making corrections where necessary

- Evaluate business requirements with regard to their effect on usability and, where applicable, include and evaluate additional usage requirements to achieve an acceptable level of usability

- Add the costs for any such additional usage requirements to the business requirement they are caused by to avoid the risk of the additional requirements being deprioritized independently of the causing requirement

- Evaluate usage requirements in terms of their business benefit as well as their effect on usability to avoid the proverbial „gold plating"

Golden rule 06

Evaluate and compare the direct and indirect benefits of requirements completely from the three perspectives of the business, the user, and the targeted solution.

3.7 Incorrect evaluations of requirements that reduce risk lead to suboptimal investments

Golden rule 07

Investigate and evaluate how requirements affect corporate risks and take this into account completely and equitably in the cost/benefit analysis.

Cause

Reducing business risks is a benefit that is relatively easy to evaluate according to a well-understood schema, provided the risk has been formulated appropriately and is recognized by the project team members. Instead, however, such potential benefits are often not taken into account at all because it is human nature to find deliberately thinking about threats as uncomfortable and therefore to avoid it as much as possible. In business life in particular, anyone who voices possible risks is often seen as trying to hinder progress, as inflexible, timid, and counter-productive. The resulting lack of proper treatment of risks and the benefit that arises from reducing risks can have two effects:

- Project team members do not look at risks and do not even recognize risk reduction as a benefit. This means that they exclude requirements aimed at reducing risks from the very beginning, deeming them useless.

- Seen objectively, any change in framework conditions, in particular a legal change, leads to a certain probability of a company having to bear certain negative consequences of any violation of such framework conditions. However, instead of evaluating this risk formally and weighing it up against the costs of countermeasures, project team members often implement countermeasures that appear suitable at first glance at any price.

Damage

Risks that are not considered and therefore implicitly evaluated at zero on the one hand, and risks that are blindly combated and therefore implicitly fully over-evaluated on the other

hand can lead to development that does not meet requirements—either because risks that could have been reduced by the project persist unchanged, or because measures that would not have been necessary, or at least not at this level of intensity, are implemented.

Countermeasures

- Establish a culture for handling risks openly and without sugarcoating them

- Elicit and analyze risks consciously and investigate and evaluate the possible effects of the project on these risks

- Take changes in risks into account systematically when considering the economic feasibility of projects

3.8 Basing thinking on what already exists prevents true innovation

Cause

Requirements are generally thought of and formulated as changes to existing circumstances. Over the long term, this can lead to the entire requirements situation having changed radically without anyone having noticed due to the small steps taken in each case. This leads to solutions that were suitable for the original problem continuing to be used even though their suitability has since declined significantly. This is caused by various phenomena:

- Requirements arise in business areas where employees execute known tasks in existing processes with existing tools on a daily basis. In these circumstances, it is very difficult to achieve complete separation from this everyday work and to think creatively and reflectively about work methods and tools.

- A very widespread opinion is that greenfield thinking is a waste of time and money and the most efficient way to find solutions is to retain as many existing findings and solutions as possible. Project team members thus actively prevent open, free, and creative thinking from the very beginning of projects, even though it is precisely at this stage that experimenting, trying things out, and rejecting ideas would be very cost-effective.

Damage

This perception, which focuses strongly on known findings and solutions, means that project team members often do not understand the current problem correctly and evaluate the suitability of existing solutions too highly. They therefore frequently miss the opportunity to achieve an optimal solution. Furthermore, over time, solutions that continue to be used for too long become increasingly difficult and expensive to maintain, and at some point, can only be replaced at an extremely high cost. The attractiveness for employees and/or customers can decrease due to processes or applications being increasingly seen as outdated.

This means that overall, no true innovation arises and any resulting potential benefits from such innovation are therefore lost.

Countermeasures

- Establish a culture that gives the phases of problem analysis and brainstorming their true importance and accordingly allows sufficient time in the project planning for these activities; applying greenfield thinking can be very helpful
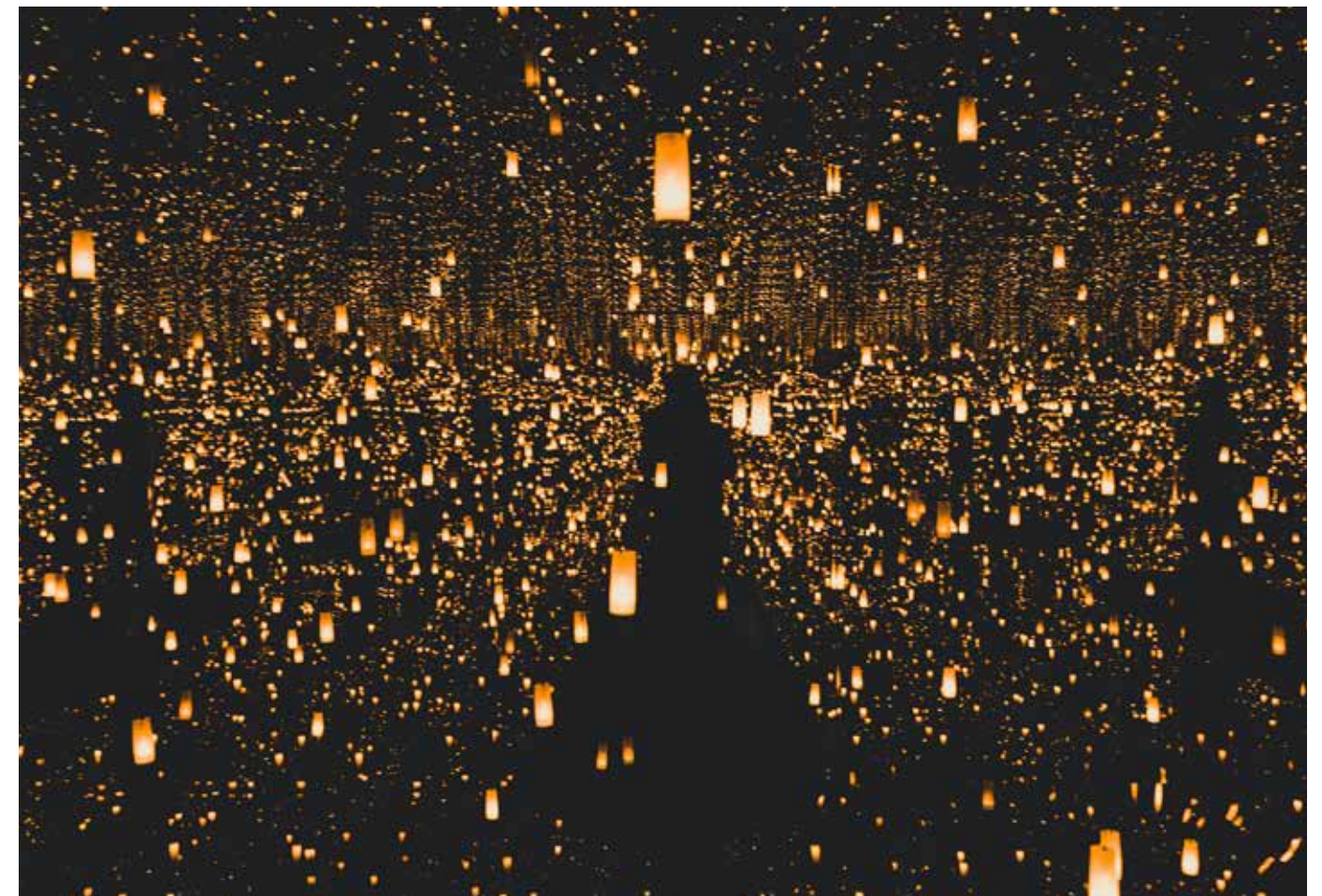
„Edison's electric light did not come about from the continuous improvement of the candle." **- Oren Harari**

- In these phases, support the creativity of project team members by giving them sufficient „mental distance" from their daily work, adequate freedom, and by applying creative techniques

- Integrate an external view in particular in early project phases—for example, the view of external consultants, new employees, or employees from a different area

Golden rule 08

Question existing work methods and solutions and rethink them at the beginning of projects—it will never be so cost-effective to do so again.

3.9 Documentation of requirements that is not aimed at the respective target groups leads to communication problems in the project

Cause

Each type of requirements documentation is suitable for a specific purpose and for a specific group of stakeholders. Detailed requirements lists are suitable, for example, for professional staff from business areas, allowing them to ensure and to assess the functional completeness of a solution. However, detailed requirements lists are not suitable for managers, who have to define the targeted business benefits, personal concerns, and the remaining framework conditions. As another example, UML models are suitable for IT experts, allowing them to analyze requirements, to check for consistency and formal completeness, and to draft solutions. However, in the business area, UML models are generally understood neither at management level nor operational level.

Nevertheless, project team members generally shy away from the effort involved in creating multiple different types of documentation to communicate the requirements to the different respective target groups — types of documentation which, to some extent are redundant, but are consistent with each other. They also underestimate the damage caused by unsuitable requirements documentation because this is hard to measure.

This problem is intensified by the current trend of misunderstanding the Agile Manifesto and largely dispensing with documentation: the requirements document that is the least suitable for communication is not a real requirements document.

Damage

As an important special case of 3.3, unsuitable requirements documents also cause similar damage: they lead either to project team members not being able to understand and assess the requirements and therefore making incorrect decisions, or to missing information having to be supported each time by unplanned additional communication, rounds of questions, presentations, ad-hoc presentations, and personal explanations (the „soundtrack").

There is not only an increased risk of incorrect decisions and undetected errors, but also a high, uncontrolled level of communication that, to some extent at least, outweighs the effort involved in creating multiple forms of documentation for specific target groups. Furthermore, unsuitable requirements documents generally lead to uncertainty amongst project team members, to stress, and to dissatisfaction.

Countermeasures

- Recognize the benefits of (requirements) documentation and act accordingly

- Create multiple forms of requirements documentation for multiple target groups and purposes, e.g., requirements lists, UML models, prototypes, presentations, etc.

- Select a suitable level of abstraction for each stakeholder group

- Make sure that the effort is proportionate to the benefit

- Make sure that the various documents are consistent

Golden rule 09

Where necessary, document requirements in different forms appropriate to the different target groups and purposes.

"... [we appreciate] working software over comprehensive documentation ..."

– Aus: Manifest für Agile Softwareentwicklung

3.10 Insufficient exhausti-on of the range of methods for eliciting requirements leads to incompleteness

Golden rule 10

Combine multiple methods for eliciting requirements to ensure that the requirements are recorded completely.

Cause

Project team members mainly elicit functional requirements only via interviews or requirements workshops with decision makers on the functional side. Other recognized methods that could increase the findings are used only rarely or insufficiently. These methods could include, for example, observing users, surveying customers using questionnaires, or market and competition analyses.

Because requirements are not elicited comprehensively, there may only be a onesided view of the required solution because some requirements aspects are not captured by the methods used. In requirements interviews, for example, the basic factors that the interviewees hold for selfevident and do not mention only rarely come to light.

The incompleteness of the requirements is made even worse by the effect that the specified method of eliciting requirements can exclude entire stakeholder groups if it is not suitable for these groups. Requirements workshops, for example, are often unsuitable for anonymous end customers because there is no representative selection and the candidates are biased. Instead of applying a more suitable method, project team members then tend to disregard the entire stakeholder group.

Damage

The requirements elicited can thus be incomplete in two ways: on the one hand, requirements not captured by a method are not taken into account, and on the other hand, entire stakeholder groups are not considered if the method of requirements elicitation is not suita-ble for them. The solution that arises is therefore incomplete and leads to expensive improvements and/or to the targeted benefit not being achieved.

Countermeasures

- Analyze stakeholders completely and evaluate them with regard to their relevance for the elicitation of requirements

- Select and schedule suitable elicitation methods for relevant stakeholders

- Be conscious in your handling of the effectiveness of the different methods and combine multiple methods such that as far as possible, all requirements aspects come to light

3.11 Results from the requirements process not being reused leads to additional work

Golden rule 11

Document the results of requirements elicitation such that they can be reused and do actually reuse them.

Cause

Project team members tend to elicit requirements from scratch in each new project. Artifacts such as conceptual models, process descriptions, descriptions of usage contexts, non-functional and functional requirements that would often only have to be changed slightly and primarily supplemented are not reused.

This is often because the results of previous projects can no longer be easily found, are available in an unsuitable form due to missing standards or standards that have changed since the results were established, or the results are documented so poorly that they can no longer be understood.

Damage

Hence, there are three ways in which work that could be avoided through reuse arises in projects:

- Eliciting, analyzing, and documenting requirements that have not changed again is very important for an overall understanding but only recreates the same work as in the previous project.

- The world of the person submitting the requirement has changed since the last time the requirements were elicited and they name the requirements that they have NOW. In this situation, the borders between what has already been realized and what needs to be changed now blur. In particular, conflicts can arise between the previous and the current requirements and cause the scope of the project that was originally planned to increase by stealth or can even lead to errors in the solution.

- Persons submitting requirements are generally not happy when „yet another project team asks the same questions again". This increases the level of work involved in the communication with the persons submitting requirements and their organization.

Countermeasures

- Document results from the requirements process completely and carefully so that over the long term, they can be understood by persons other than the original project team members

- Create a uniform, stable, storage infrastructure for these results that is understood, accepted, and accessible for all and use this infrastructure consistently

- Anchor the review of existing results in the process for eliciting requirements

- Create an awareness for when reuse is useful and when it tends to prevent creativity instead (see Section 3.12)

3.12 Blindly reusing results from the requirements process prevents innovation

"*If I had asked people what they wanted, they would have said 'faster horses'.*" **- Henry Ford**

Cause

If project team members reuse results from previous requirements elicitation processes (see Section 3.11), they often do so without reflection, without checking that the results are still valid, or checking that the results are generally free of conflict and, with the new requirements, are complete.

Once again, the cause for this can be that the documentation for existing requirements can be difficult to find, which leads to this check being seen as having been done informally if individual project team members do not intuitively detect any anomalies from memory.

Project team members also often underestimate the importance of this overarching validity, completeness, and freedom from conflict and shy away from the effort involved in the check.

The quality of the documentation is also important if project team members can no longer understand the existing requirements from the documentation and then implicitly assume they are correct „because they were correct back then".

Damage

This can lead to similar effects as those described in Section 3.8: with each further development, the requirements move further away from the actual needs and the solution that arises moves further away from the optimum. The implicit, but not necessarily correct assumption that the best way to fulfill requirements that have been changed „only slightly" is with a solution that is changed „only slightly" leads to continuously increasing implementation, maintenance, and operating costs and risks.

Countermeasures

- The countermeasures from Section 3.11

- Check requirements documents that are to be reused carefully for validity and compatibility with the new requirements

- Schedule the work involved in this check

- Also plan for the fact that this check can produce a negative result and thus the entire requirements may have to be elicited again

Golden rule 12

Carefully check results from previous requirements elicitation processes that are to be reused to ensure that they are still valid and plan for the possibility of having to change or replace them.

3.13 Separate consideration of business and usage requirements leads to suboptimal solutions

This effect is amplified when project team members change during the course of problem analysis and identification of solutions and new project team members assume that the previous phase has seen this connection and taken it into account in the interim results handed over. In the DB group, this happens frequently when business requirements are elicited in the management team — where applicable by corporate consultants — but the solution is then designed with employees by an IT service provider.

Cause

Projects generally arise due to changed requirements for business processes, organizational units, or products:

- Something should work faster, cheaper, with fewer errors, more transparently

- Hierarchies should be flatter, units larger or smaller, decisions faster and more secure

- There are new, changed, or discontinued products

Implementing these requirements affects the organization and changes the work methods and tasks of the management team and the employees, which then results in changed requirements for the IT solution.
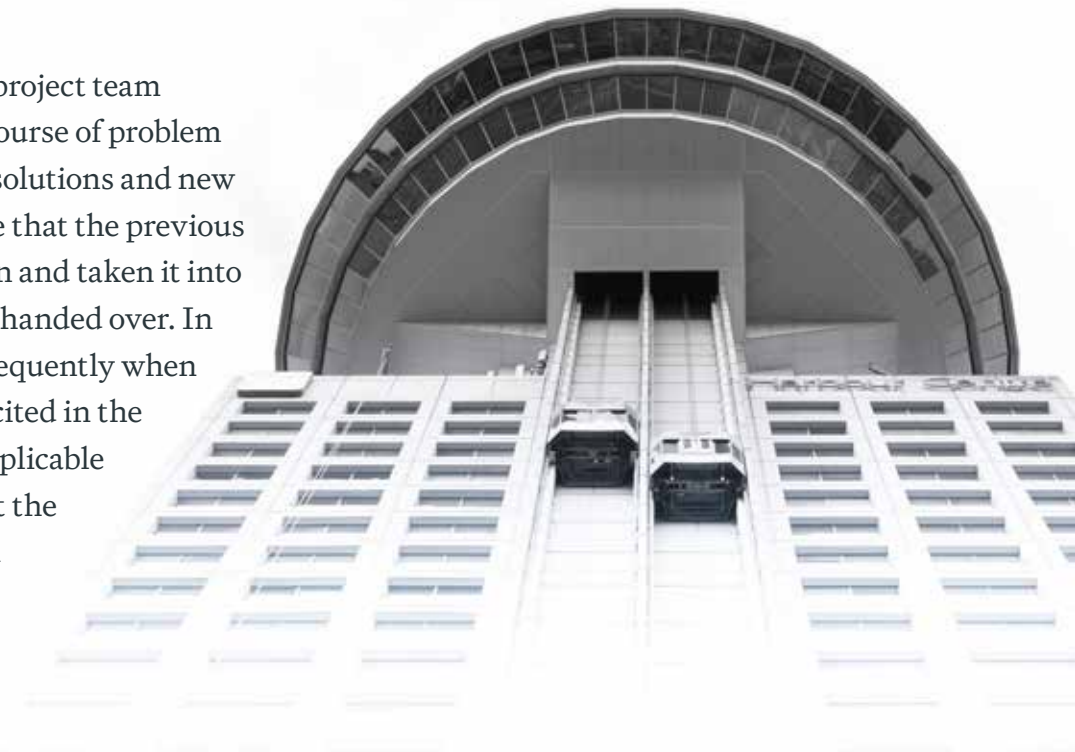
However, project team members often look at requirements only at certain points along this chain, rather than along the entire chain.

- For example, it is often the case that, instead of limiting themselves to formulating just the business requirements, business managers often formulate the usage requirements

at the same, in the belief that they know how the employees work.

- Alternatively, requirements analysts try to elicit usage requirements from employees to whom changed business requirements have not yet been communicated and who have not been able to think about the effects of these changed business requirements on their work processes.

- Project team members decide on blanket requirement elicitation methods, for example, usage context analyses with users, or requirements workshops with managers, or both („we always do it that way") without seeing and exploiting the connection between the methods. Here, a common assumption is that the one method automatically contains the findings of the other method — simply because it is experts who know what they are doing who are being questioned or observed. This assumption is incorrect. It is also incorrect to assume that the results of these different methods cannot contradict one another because they all have the same overall objective.

Damage

If requirements are not considered completely, then the very least that can happen is that requirements cannot be elicited completely. Because the connections along the requirements chain are not detected, the risk of undetected conflicts in the requirements increases. In addition, requirements may be missing, or superfluous requirements can even be created if one stakeholder group formulates requirements representatively for another group.

Overall, errors are again detected too late, the solution created may not be accepted and may even be unusable, and the improvements required are expensive and can cause the project to fail completely (see also 3.6, 3.1, 3.10).

Countermeasures

- Look at the entire requirements chain, from the business necessity, through operational implementation, up to the required solution

- Handle the dependencies along this chain actively and carefully

- Manage the change as a whole: plan and communicate all activities required for problem analysis, identification of solutions, and solution implementation carefully and integrate all persons who will ever be involved

- Plan sufficient time and resources for the people involved in implementation so that they can implement the change themselves

Golden rule 13

Always look at all requirements in the context of the business necessity, through operational implementation, up to the IT solution.

4. Imprint

Imprint

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